

**IOWA DEPARTMENT OF NATURAL RESOURCES
AIR QUALITY BUREAU**

**Prevention of Significant Deterioration (PSD) Permit Review
Technical Support Document for Permit Issuance**

**Hawkeye Generating, LLC
Adair Union ST
Orient, Iowa 50858**

**Plant Number 01-04-003
Project Number 01-687**

Introduction

Hawkeye Generating has applied to the Iowa Department of Natural Resources (DNR) for a Prevention of Significant Deterioration (PSD) permit and State of Iowa construction permits for installation of a natural gas fired electric generating plant located at Adair Union ST, Orient, Iowa 50858. Hawkeye Generating, LLC (HG) is a wholly owned subsidiary of Entergy Power Generation Corporation.

The proposed project will involve the installation of two General Electric PG7241 (FA) (GE 7FA) natural gas fired combustion turbine generators (CTGs). The nominal electric generating capacity is 580 MW based on annual average conditions and will have a summer peak capacity of 615 MW. This will be a phased project with two phases. "Phase 1" is defined as construction of the facility with two turbines operating in simple cycle mode for up to a total of 4000 hours operation. "Phase 2" is defined as construction of the facility with two turbines operating in either combined cycle or simple cycle. Phase 2 is limited as follows:

1. Total duct burner fuel usage for the two turbines shall not exceed 3,983,100,000 standard cubic feet of natural gas per rolling twelve-month period (equivalent to a total of 9000 operating hours).
2. Total simple cycle fuel usage for the two turbines shall not exceed 7,600,000,000 standard cubic feet of natural gas per rolling twelve-month period (equivalent to a total of 4000 operating hours).
3. Total natural gas usage for the two turbines operating in simple cycle or combined cycle operation (including duct burners) shall not exceed 33,767,000,000 standard cubic feet of natural gas per rolling twelve-month period (based on 8760 hours combined cycle with duct burners X2 turbines).

BACT emission limits for this project are as follows (adjusted to 15% oxygen for NO₂ & CO):

	NO ₂ (ppmvd)	CO (ppmvd)	Averaging Time (hourly rolling avg.)	BACT
Simple Cycle	9		3	DLN Combustors
Simple Cycle		9	3	GCP
Combined Cycle	3		3	DLN Combustors, SCR
Combined Cycle		5	3	Catalytic Oxidation

Phase 1 construction shall commence within eighteen (18) months of the permit issuance date and shall be completed within thirty-six (36) months of the permit issuance date. Phase 2 construction shall commence no later than July 23, 2005 and shall be completed no later than January 23, 2007. In the event Phase 2 construction has not commenced within thirty-six (36) months of the permit issuance date, before Phase 2 construction may commence the BACT determination shall be re-evaluated for simple cycle operation. Phase 1 shall include installation of the following emission units: the emergency generator, fire pump, fuel preheater #1 and fuel preheater #2. Phase 2 shall include installation of the following emission units: the HRSG with duct burners and the auxiliary boiler.

The proposed plant will also include the following ancillary equipment:

- Auxiliary Boiler
- Emergency Generator
- Fuel Preheater #1
- Fuel Preheater #2
- Fire Pump

Introduction to New Source Review (NSR) and Prevention of Significant Deterioration (PSD)

The DNR finds that the proposed project is subject to the requirements of 567 Iowa Administrative Code Chapter 22. This project has been reviewed to determine whether it is subject to the PSD regulations found in 42 U.S.C. Section 7470 et al. (Clean Air Act (CAA) Sections 160 et. Al.) and found in 40 C.F.R. Part 52.

This review has been conducted as a result of the Environmental Protection Agency's delegation to DNR of the responsibility to review sources in Iowa for compliance with PSD. DNR finds that the construction of this electric generating plant is subject to these regulations.

The purpose of PSD is to prevent significant deterioration of the air quality in identified regions. Within these regions, there is a classification system by which it is determined whether and the extent to which air quality may be deteriorated. PSD regulations affect the construction of major industrial facilities occurring in these areas. One of the key requirements is to conduct a Best Available Control Technology (BACT) analysis for each proposed unit within the facility.

To be subject to PSD, the source to be constructed first must be located in an area where National Ambient Air quality Standards (NAAQS) have not been exceeded for any criteria pollutant listed in Section 107 of the CAA, and which is designated as "attainment" or "unclassifiable". Second, the facility must be considered a "major stationary source" or "major emitting facility", defined in Section 169 of the CAA as any one of the 28 types of sources with the potential to emit 100 tons per year (TPY) or more of any pollutant regulated in the CAA or any other type of source with the potential to emit regulated pollutants in amounts equal to or greater than 250 TPY. "Potential to emit" is the capability at maximum design capacity to emit a pollutant after the application of air pollution control equipment and after taking into account all federally enforceable limitations restricting the hours of operation or the type or amount of material combusted or processed.

There are three classifications for areas covered by PSD: Class I, Class II, and Class III. Class I areas include national parks and wilderness areas, and are considered to be the areas where the air quality is the highest. Class II includes all areas not designated as Class I or as Class III. Class II areas may be re-designated as Class III areas by a State after an opportunity for public comment. The subject facility is located in a Class II area. The nearest Class I area is located over 250 miles from the facility. PSD requires that the applicant analyze the possible effects of the proposed modification on Class I areas in the vicinity.

Hawkeye Generating has proposed the construction of a natural gas fired electric generating plant. The location of the plant is in an area designated as attainment for all criteria pollutants including nitrogen dioxide (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), lead, particulate matter (PM), particulate matter less than ten microns in aerodynamic diameter (PM₁₀) and ozone (regulated as ozone and Volatile Organic Compounds).

This is a "phased" PSD permit application for which the permit will be issued under provisions of 40 CFR 52.21 (j)(4) and 40 CFR 52.21 (r)(2). In addition, all permits issued under those sections must also address the concerns of the EPA Administrator regarding "phased" PSD projects as found in the preamble to the proposal for the 1980 PSD rule (43 Federal Register 26396, June 19, 1978). For the purposes of this project, "Phase 1" is defined as construction of the facility with two turbines operating in simple cycle mode. "Phase 2" is defined as construction of the facility with two turbines operating in either combined cycle or simple cycle mode. Phase 1 of this permit shall become void if construction of that phase has not commenced within eighteen (18) months of the permit issuance date or if construction of this phase is not completed within thirty-six (36) months of the permit issuance date. Phase 2 of this permit shall become void if construction has not commenced by July 23, 2005 or is not completed by January 23, 2007. If the permit for Phase 2 is voided then the permit limits in force at the time shall remain in force. Individual phases of this permit shall become void if construction of any phase is discontinued for a period of eighteen (18) months.

Phase 1 shall include installation of the following emission units: the emergency generator, fire pump, fuel preheater #1 and fuel preheater #2. Phase 2 shall include installation of the following emission units: the

HRSRG with duct burners and the auxiliary boiler. Phase 1 allows up to a total of 4000 hours of simple cycle operation. Phase 2 allows up to 8760 hours of combined cycle operation of which simple cycle operation shall not exceed a total of 4000 hours. Annual emissions for Phase 2 are limited based on 8760 hours of combined cycle operation (with duct burners).

PSD Applicability

Hawkeye Generating's permit application identified the following levels of potential emissions in tons of pollutant per year.

<u>POLLUTANT</u>	<u>Phase 1 Emissions (TPY)</u>	<u>Phase 2 Emissions (TPY)</u>
Nitrogen Oxides, NO _x	135.05	195.52
Particulate Matter, PM ₁₀	38.60	212.97
Monoxide, CO	69.22	199.78
Sulfur Dioxide, SO ₂	8.93	38.85
Volatile Organic Compounds, VOC	11.28	59.36

For purposes of this review, total suspended particulate (TSP) and PM₁₀ emissions have been considered and modeled as PM₁₀.

The facility under construction is a major stationary source. It belongs to one of the 28 named source categories (Fossil fuel-fired steam electric plants of more than 250 MMBtu/Hr heat input) identified in Section 169 of the CAA, subject to a 100-ton per year emissions threshold. The pollutants that exceed the major source thresholds thereby requiring PSD review include NO_x, PM₁₀, CO, & VOCs. It should be noted that SO₂ has a synthetic minor limit based on fuel usage.

The combustion turbines are subject to NSPS Subpart GG; 40 CFR 60.330, Standards of Performance for Stationary Gas Turbines. The duct burners are subject to NSPS Subpart Db; 40 CFR 60.40b, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. Additionally, the auxiliary boiler is subject to NSPS Subpart Dc; 40 CFR 60.40c, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units.

Analysis of Application

Once it is determined that a proposed project is subject to PSD review, the applicant must:

1. Demonstrate what is the Best Available Control Technology (BACT) for each PSD pollutant for every source that emits that pollutant.
2. Perform an ambient air quality analysis to demonstrate that the increase in emissions from the proposed project and associated growth due to the project will not exceed National Ambient Air Quality Standards (NAAQS) or applicable PSD increments.
3. Perform additional analysis to study the effects of increased emissions on soils, vegetation, and visibility. Address the impact of associated growth upon air quality in the vicinity.
4. Demonstrate that the source will not adversely impact a designated PSD Class I area.

Best Available Control Technology (BACT)

Best Available Control Technology (BACT) is an emission limit, associated control technology and efficiency based on the degree of pollution reduction which DNR determines is achievable, taking into account energy, environmental, economic and other factors. All major stationary sources or major modifications that are subject to PSD regulations must conduct an analysis to ensure that BACT is specified for each pollutant which exceeds the PSD “significant” thresholds. Each BACT analysis is conducted on a case-by-case basis and is valid for only that area in which the source is locating. No technology may be approved which is less stringent than the New Source Performance Standards (NSPS) found at 40 C.F.R. Part 60 or any of the applicable Nation Emission Standard for Hazardous Air Pollutants (NESHAPs) found in 40 C.F.R. Part 61.

PSD Ambient Air Quality Analysis

For a PSD permit application to be approved, the applicant must demonstrate (by use of an approved air quality dispersion computer modeling analysis) that the proposed project will not result in a violation of the NAAQS and will not consume more than the allowable PSD available increment. If the applicant can demonstrate that the proposed project does not have a significant ambient impact as listed below no further ambient air analyses is necessary.

<u>Pollutant</u>	<u>Annual</u>	<u>24 Hour</u>	<u>8 Hour</u>	<u>1 Hour</u>
NO _x	1.0 ug/m ³	---	---	---
PM ₁₀	1.0 ug/m ³	5 ug/m ³ ---	---	---

Air dispersion modeling was submitted by Hawkeye Generating and was reviewed by the Department for accuracy and completeness. Preliminary modeling indicated that concentrations of NO_x, CO and PM₁₀ during simple cycle operation and predicted concentrations of CO during combined cycle operation are all below the applicable PSD significant impact levels. During combined cycle operation predicted concentrations of NO_x and PM₁₀ exceed the applicable PSD significant impact levels for those pollutants. However, the refined modeling analyses of the NO_x and PM₁₀ emissions indicate that ambient air quality impacts are well below the applicable NAAQS and PSD increments.

The following shows the Preliminary (Significance) Modeling Results:

<u>Pollutant</u>	<u>Annual</u>	<u>24 Hour</u>	<u>8 Hour</u>	<u>1 Hour</u>
NO _x	1.99 ug/m ³	---	---	---
PM ₁₀	0.60 ug/m ³	10.01 ug/m ³	---	---

The following shows the Refined (NAAQS and Increment) Modeling Results:

Combined Cycle Refined (NAAQS and Increment) Modeling Results for PM-10.

Averaging Period	PM-10 Predicted Concentration* (ug/m ³)	PM-10 Background (ug/m ³)	Total PM-10 Impact (ug/m ³)	PM-10 NAAQS (ug/m ³)	Class II PM-10 Increment (ug/m ³)
24-hour (NAAQS) highest, sixth high	6.25	52	58.25	150	NA
24-hour (Increment) highest, second high	8.72	NA	8.72	NA	30
Annual (NAAQS)	0.51	26	26.51	50	NA
Annual (Increment)	0.51	NA	0.51	NA	17

* Predicted PM-10 concentrations for the 24-hour averaging period are the highest, sixth high value for comparison with the NAAQS and the highest, second high value for the increment consumption analysis. Predicted PM-10 concentrations for the annual averaging period are the highest values.

Combined Cycle Refined (NAAQS and Increment) Modeling Results for NO₂.

Averaging Period	NO ₂ Predicted Concentration* (µg/m ³)	NO _x Background** (µg/m ³)	Total NO ₂ Impact (µg/m ³)	NO ₂ NAAQS (µg/m ³)	Class II NO ₂ Increment (µg/m ³)
Annual (NAAQS)	2.26	14	16.26	100	NA
Annual (Increment)	2.26	NA	2.26	NA	25

* Predicted NO₂ concentrations are the highest values multiplied by the annual national default NO₂/NO_x ratio of 0.75.

** Assume NO_x = NO₂

Ambient Air Monitoring

The PSD regulations require an applicant to do several different ambient air analyses, including but not limited to both pre- and post- construction ambient air monitoring. These requirements are outlined in 40 CFR 52.21(m). However, 40 CFR 52.21(i)(8) allows the Administrator to except a project from the requirements of 40 CFR 52.21(m) if the air quality impacts from the proposed sources is less than the values listed below.

<u>Pollutant</u>	<u>Annual</u>	<u>24 Hour</u>	<u>8 Hour</u>
NO _x	14 ug/m ³	---	---
PM ₁₀	---	10 ug/m ³	---
CO	---	---	575 ug/m ³

As the predicted ambient air impact is exceeded for PM₁₀, Hawkeye Generating is subject to the requirements of 40 CFR 52.21(m).

Wilderness and Parkland Protection

The PSD program provides for additional consideration of the impacts of increased emissions for national parks and wilderness areas. The nearest area to qualify for additional consideration are the Hercules-Glades National Wilderness Areas managed by the U.S. Forest Service and the Mingo National Wilderness Areas managed by the U.S. Fish and Wildlife Service. These two Class I areas are more than 280 miles away from the proposed facility and will not be affected by the proposed sources. The Department is confident that Hawkeye's proposed project would not impact this wilderness area.

Additional Impact Analyses

Growth Analysis:

It is estimated that construction of the proposed facility will employ between 400 and 450 workers from the local and surrounding workforce throughout the two-year construction period. Once the facility becomes operational, it is anticipated the facility will employ approximately 24 full time employees with four or five employees working a typical shift.

Traffic in the area will increase by a number of vehicles approximately equal to the number of people who will be employed by the plant, and occasional transport vehicles bringing parts and supplies, or picking up materials for disposal. With improvements to the roads accessing the site, the permanent impact to traffic in the area is not expected to be significant.

It is further expected that any temporary higher demand placed upon housing, traffic and any other community services as a result of a temporary influx of workers during the construction of the proposed facility will be minimal and of a short duration. Hawkeye Generating is expecting little or no permanent impact on Adair and Union counties or on Orient's public infrastructures such as housing, health facilities, fire and public protection, and schools. This power project is not expected to have the indirect result of establishing of new industry, and hence of contributing any additional air pollutants due to the availability of the electricity generated by this project.

Soils & Vegetation:

Section 14.4.2 (Soils and Vegetation Impacts) of the submitted report focused more on the adverse impacts from construction, maintenance and operation of the Hawkeye facility, rather than on the ambient air impacts on the soils and vegetation as a result of the proposed facility. The annual NO_x concentrations are just over the PSD significant impact level, nearly low enough to preclude a soils and vegetation analysis, and well below the secondary NO_x NAAQS. Due to EPA's concern on previous projects that short-term NO_x emissions may cause serious damage to susceptible vegetation, a short-term NO_x modeling analysis was conducted by the IDNR. Using the operating scenario that resulted in the highest predicted 1-hr concentrations and the maximum NO_x emission rates from the combined cycle combustion turbine operation, the highest predicted 1-hour NO_x concentration was 29.9 µg/m³. This value is less than one one-hundredth of the NO₂ concentration which would result in 5% foliar injury to susceptible vegetation as listed in Table 1 of the presentation "Soils and Vegetation Impacts Analysis under the PSD Program" as prepared by Jon Knodel (EPA Region 7) on May 13, 2002. Although, NO_x and SO₂ in combination may impact soils and vegetation at lower ambient concentrations than each pollutant would when considered alone, SO₂ emissions from the Hawkeye facility are insignificant.

Visibility Analysis:

No visibility analysis was required for this project. There are no Class I areas within 100 km of the proposed facility. The nearest sensitive area is Lake Orient, approximately 3 km to the north of Hawkeye. Because the significant impact areas for both PM-10 and NO_x are within 1 km of the proposed facility, no Class II visibility analysis is required.

Preliminary Determinations

Based upon information in the administrative record including public comments and input, DNR will consider approving the permit applications received from Hawkeye Generating subject to the conditions outlined in the attached draft permits.

Any owner or operator of a source or modification that is subject to PSD regulations shall not commence construction without first receiving approval from the agency designated to implement the PSD program. Any owner or operator, who constructs, modifies, relocates or operates an affected source not in accordance with the PSD permit conditions shall be subject to federal enforcement action under Sections 113 and 167 of the CAA. The PSD regulations also provide that issuance of a permit shall not relieve the source of the obligation to comply with all applicable State Implementation Plan (SIP), federal and local air pollution standards.

Requirements of PSD Public Notice

All PSD permits must be put on public notice, as required by 40 CFR 51. The DNR will make available in Air Quality Bureau Records Center, 7900 Hickman Road Suite 1, Urbandale, Iowa the following:

- a copy of all materials the applicant submitted
- a copy of this determination

The DNR will notify the public in the Des Moines Register newspaper of the PSD application, the determination, the opportunity for comment at a public hearing, and the opportunity for written public comment.

All persons, including the applicant, who have comments regarding the issuance of the attached draft permits, are encouraged to submit their comments. Factual grounds supporting a commentator's position, including all supporting materials, should be submitted by the close of the public comment period. All supporting material must be included in full and may not be incorporated by reference unless the material is already part of the administrative record, or consists of State or Federal statutes and regulations, EPA documents of general applicability, or other available reference materials. To comply with the above requirements, interested persons may request a longer comment period.

Reopening the Public Comment Period

If information or comments submitted to DNR during the public comment period appear to raise substantial new questions concerning the draft permits, then DNR may prepare revised draft permits, a revised fact sheet or may reopen or extend the public comment period. Public notice of any reopening or extension of the public comment period shall be issued by the central office of the DNR.

PSD Best Available Control Technology (BACT) Analysis

Source Identification

Hawkeye Generating has identified the following equipment as requiring a PSD construction permit.

<u>Source</u>		<u>Permit Number</u>
STK1	Combustion Turbine #1	02-A-199-P
	HRSG with Duct Burner #1	
STK2	Combustion Turbine #2	02-A-200-P
	HRSG with Duct Burner #2	
SAUXB	Auxiliary Boiler	02-A-201-P
SEMG	Emergency Generator	02-A-202-P
SCTGB1	Combustion Turbine #1 (Simple Cycle)	02-A-203-P
SCTGB2	Combustion Turbine #2 (Simple Cycle)	02-A-204-P
SFGH1	Fuel Preheater #1	02-A-205-P
SFGH2	Fuel Preheater #2	02-A-206-P
SFWP	Fire Pump	02-A-207-P

BACT Determinations

Attached to this document are the source-by-source BACT determinations for the sources identified above.